Problem 1: Projectile Motion with Drag and Wind

Problem: Solve the projectile motion with both drag and wind included.

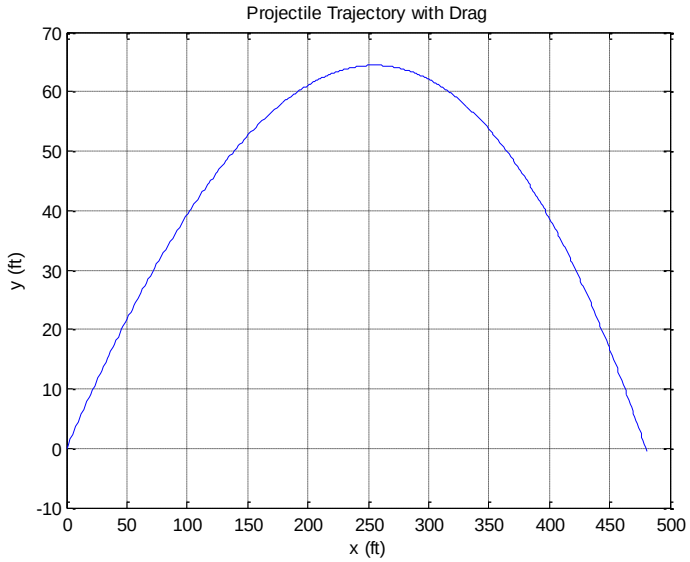


Figure 1: Projectile with Drag and Tail Wind

Distance of the matlab solution is 480. Slight shorter due the variation in the slider values from the exact values in matlab.

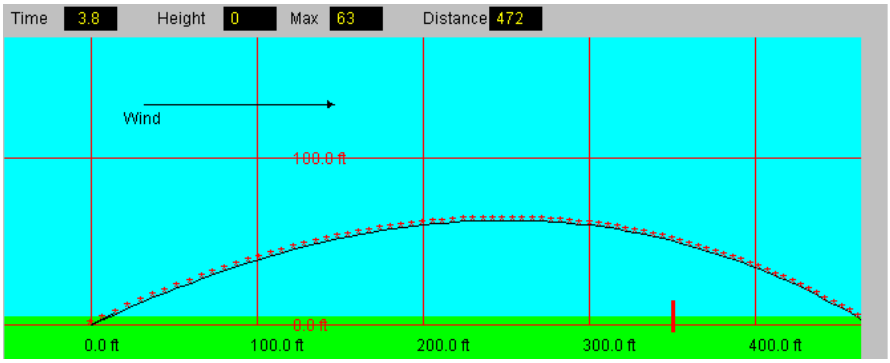


Figure 2: Projectile with Drag and Tail Wind

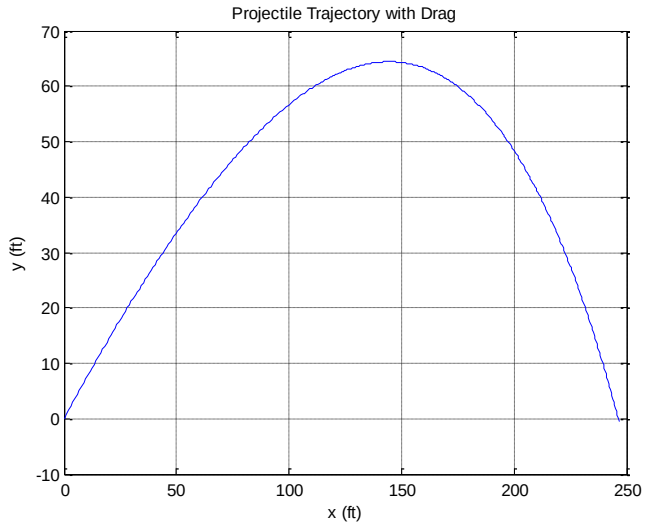


Figure 3: Projectile with Drag and Head Wind

Distance of the matlab solution is 246 ft. Slight shorter due the variation in the slider values from the exact values in matlab.

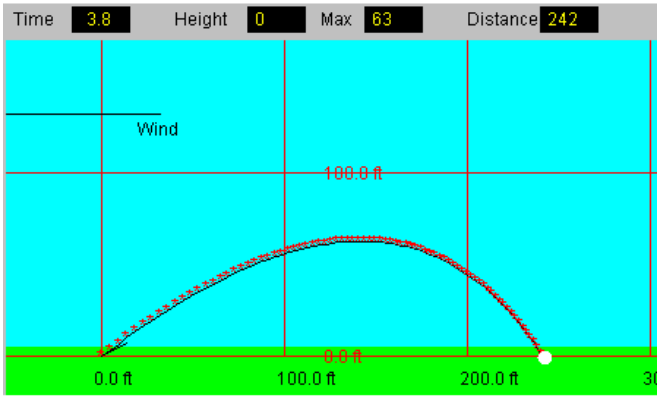
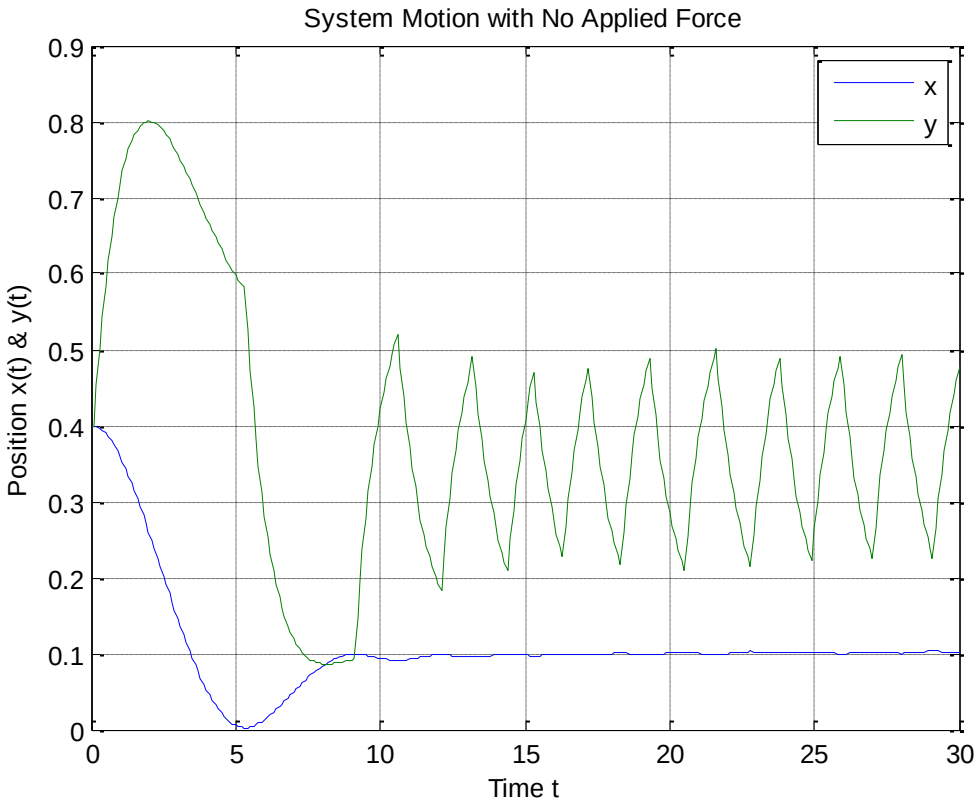


Figure 4: Projectile with Drag and Head Wind

Problem 2: Mechanical System with Applied Force

Problem: Find a Force where x(t) is never negative given that when v≥0 F = 0 and when v<0 F=A



Solution: Using matlab minimum force needed for positive x displacement is 1.07.

```
while tcount<=tmax
    if v(i)>=0 %checks for negative velocity and how to set the force
        Fapplied = 0;
    else
        Fapplied = Fx;
    end
    vgrad(i) = (-(K1+K2)*x(i)+K1*y(i)-B1*v(i))/M;
    ygrad(i) = (4/B2)*(K1*x(i)-K1*y(i)+Fapplied);
    v(i+1) = v(i) + vgrad(i)*dt;
    x(i+1) = x(i) + v(i)*dt;
    y(i+1) = y(i) + ygrad(i)*dt;
    i = i + 1; %while loop counter
    tcount = tcount + 0.1; %time step = 0.1;
    if x(i)<0  %Reset Process and Increase Applied Constant Force
        farray(n) = Fx; %stores change in force in an array
        Fx = Fx+0.01;
        i = 1;
        tcount = 0;
        n = n+1; %for loop counter
    end
end
```